Open to experiencing…meat alternatives? The HEXACO personality model and willingness to try, buy, and pay among omnivores

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ABSTRACT

Meat alternatives have risen in popularity due to increased health, environmental, and animal welfare concerns. We add to emerging literature examining factors influencing meat alternative consumption. Using the recent development of a meat alternative taxonomy (traditional plant-based meat alternatives, pulses, insects, textured vegetable protein, and cultured meat; Onwezen et al., 2021), we examine how the HEXACO personality model is associated with willingness to try, buy, and pay for five unique categories of meat alternatives. In a two-part online survey, participants completed the HEXACO (n = 478) and then completed the meat alternative willingness to try, buy, and pay survey (n = 451). Personality differentially predicted each type of meat alternative willingness to try, buy, and pay, with more novel forms such as insects and cultured meat differentiating from more traditional forms. Importantly, Openness to Experience was associated with heightened willingness to try, buy, and pay for all meat alternatives. Implications for governments, non-profits, managers, and researchers are discussed.

1. Introduction

The global market for meat alternatives – foods eaten in place of animal meats – is steadily rising and predicted to reach $7.5 billion by 2025 (Bourassa, 2021). These products, such as those made by Beyond Meat™, are becoming so available and recognizable that mainstream media termed 2019 "the year of the plant-based burger" (He et al., 2020). The introduction of meat alternatives to mainstream retail outlets represents a shift in the meat alternative industry: while these products have been associated with vegan and vegetarian consumers for many years, meat alternatives are now more widely accessible and approachable to the average consumer. Uncoincidentally, this has come at a time where evidence of the negative impact of meat consumption on human health (Al-Shaar et al., 2020; Boada et al., 2016; Wang et al., 2016), environmental sustainability (de Boer, Schösler, & Aiking, 2014; Rotz et al., 2019), and animal welfare (Rahimi et al., 2022; Vanhonacker et al., 2009) is building.

Given that a reduction of meat consumption can offer a remedy to the health, environmental, and ethical harms caused by meat consumption (He et al., 2020), people in general are more interested in changing their

behaviour around meat (Duckett et al., 2021; Knaapila et al., 2022). However, not everyone is inclined to consume meat alternatives. In other ethical domains, personality (Soutter et al., 2020) and other individual differences (e.g., just world beliefs; White et al., 2012) predict consumption. What makes an individual more or less inclined toward meat alternatives? We examined the role of personality factors in meat alternative consumption. Our investigation has significant theoretical and practical importance for a range of stakeholders; we expand on these contributions below.

1.1. Individual differences and meat alternatives

We defined meat alternatives as a category of food items that are eaten in place of animal meats. Animal meats are typically included in individuals' diets to ensure sufficient protein is consumed, as recommended by governmental health authorities (Health Canada, 2019; Public Health England, 2018; U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2020), although these dietary guidelines have begun to include meat alternatives as a source of protein as well. While the literature on meat alternatives ranges in types

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and items considered, there are several categories that are frequently examined: traditional plant-based meat alternatives (PBMA; e.g., tofu, seitan, tempeh), pulses (e.g., lentils, chickpeas, beans), textured vegetable protein (TVP; a common ingredient in veggie burgers and hot dogs) products, cultured meat (real meat grown via in vitro cell cultures of animal cells), and insects (e.g., crickets, mealworms, and some beetles; Ardoin & Prinyawiwatkul, 2021; He et al., 2020; Lee et al., 2020; Onwezen et al., 2021).

The extant literature on consumer engagement with meat alternatives has explored individual differences on consumer perception, predictors, and inhibitors of attitudes, intentions, and consumption. Predictors of positive meat alternative intentions or consumption include heightened ethical concerns such as perception of the meat alternative as more sustainable (de Koning et al. 2020; Hwang et al., 2020); increased food curiosity (Hwang et al., 2020); perceptions of the product such as higher nutritional importance, product sensory attributes (de Koning et al., 2020), preferred taste, increased familiarity (Onwezen et al., 2021); and social norms and attitudes (Eckl et al., 2021; Onwezen et al., 2021). Furthermore, known predictors of negative meat alternative intentions or consumption include higher food neophobia (Eckl et al., 2021; de Koning et al., 2020; Hwang et al., 2020; Onwezen et al., 2021;); greater distrust of biotechnology (Hwang et al., 2020); greater perceived product unnaturalness (Hwang et al., 2020); core visceral disgust (Tuccillo et al., 2020), and higher meat attachment (Onwezen et al., 2021).

Hartmann et al. (2018) found consumers who purchase or consume insect-based and vegetarian burgers were perceived by others to be more health-conscious, imaginative, brave, interesting, and knowledgeable. Additionally, gender appears to have a different influence on meat alternative intentions or consumption depending on the type of alternative: insects are more accepted by males (Onwezen et al., 2021; Verbeke, 2015), traditional PBMA are more accepted by females (Onwezen et al., 2021), and there is no relationship for cultured meat (Weinrich et al., 2020). Examining personality's association with a broader willingness to substitute meat products, Begue and Treich (2019) found participants who removed meat and fish once a week in their diets had higher individual Openness compared to the general population.

A review by Onwezen et al. (2021) establishes that the specific relevance of the examined predictors and inhibitors of engagement with meat alternatives differs between individuals; furthermore, they call for future research on this topic to be more person specific. Certainly, the categories of meat alternative outlined by these researchers (i.e., traditional PBMAs, pulses. textured vegetable protein products, cultured meat, and insects; Onwezen et al., 2021) differ in meaningful ways. For example, some have a high degree of novelty or potential for disgust (e. g., cultured meat or insects), others may be well normalized as meat alternatives (e.g., textured vegetable protein, traditional PBMA), while consumers may not even consider others as "meat alternatives" (e.g., pulses). We answer Onwezen et al.'s (2021) call by examining associations between personality and outcomes surrounding meat alternatives. Whereas prior work has collapsed across these meaningful distinctions, ours is the first to our knowledge to operationalize meat alternatives in a more nuanced way when examining the role that personality characteristics play. We thus also expand on Begue and Treich (2019) by considering associations between personality and willingness to try, buy, and pay for specific meat alternative categories, rather than examining meat reduction or meat alternatives more generally.

1.2. Hexaco personality model

HEXACO is a personality model established by Lee and Ashton (2004), which includes six dimensions (i.e., "factors") of personality: Honesty-Humility, Emotionality, eXtraversion, Agreeableness, Conscientiousness, and Openness to Experience. Each personality factor contains four facets (see Table 1), allowing for a wider understanding of

Table 1
HEXACO Factor and Facet Names.

HEXACO Factor	HEXACO Facet	Description (Lee & Ashton, 2009)
Honesty-Humility		Honesty-Humility describes willingness to manipulate others for personal gain, respect for rules and authority, interest in luxury, and desire for social status.
	Sincerity	Sincerity considers an individual's willingness to be genuine in social interaction.
	Fairness	Fairness considers an individual's proclivity to avoid fraud and corruption.
	Greed-Avoidance	Greed-Avoidance considers the relative uninterest of an individual for wealth, luxury, and social status.
	Modesty	Modesty considers an individual's proclivity for modesty and being unassuming.
Emotionality		Emotionality describes likelihood to be more fearful, experience anxiety, desire emotional support from friends and family, and feel greater empathy for others.
	Fearfulness	Fearfulness considers degree to which an individual experiences fear.
	Anxiety	Anxiety considers an individual's proclivity to worry in day-to-day life.
	Dependence	Dependence considers an individual's desire for external emotional support and validation.
	Sentimentality	Sentimentality considers the strength of an individual's emotional bonds.
Extraversion		Extraversion describes positive self-image, confidence in leadership positions, enjoyment of social engagements, and degree of enthusiasm and energy in day-to-day life.
	Social Self-Esteem	Social Self-Esteem considers the proclivity for a positive self-image in social situations.
	Social Boldness	Social Boldness considers an individual's comfort in a variety of social contexts.
	Sociability	Sociability considers an individual's interest and enjoyment of social interaction and parties.
	Liveliness	Liveliness considers an individual's regular enthusiasm and energy levels.
Agreeableness		Agreeableness describes willingness to forgive wrongs, leniency in the judgements of others, willingness to compromise, and ability to control angry outbursts.
	Forgiveness	Forgiveness considers an individual's willingness to trust and engage with those who have previously wronged them.
	Gentleness	Gentleness considers an individual's proclivity for leniency and mild-mannered attitude in social interactions.
	Flexibility	Flexibility considers an individual's willingness to cooperate with others.
	Patience	Patience considers an individual's proclivity for calm patience as opposed to anger.
Conscientiousness		Conscientiousness describes the level of organization, discipline in the pursuit of goals, the desire for accuracy and perfection, and careful decision-making.
	Organization	Organization considers the proclivity to seek order in an individual's surroundings.

Table 1 (*continued*)

HEXACO Factor	HEXACO Facet	Description (Lee & Ashton, 2009)
	Diligence	Diligence considers an individual's work ethic.
	Perfectionism	Perfectionism considers an individual's interest in details and thoroughness.
	Prudence	Prudence considers an individual's proclivity for self-control and careful deliberation.
Openness to Experience		Openness to Experience describes the ability to be absorbed by art and beauty, the interest in expanding one's knowledge, the ability to utilize a large imagination, and the interest in novel ideas or situations.
	Aesthetic Appreciation	Aesthetic Appreciation considers an individual's enjoyment of art and nature.
	Inquisitiveness	Inquisitiveness considers an individual's interest in pursuing a deeper understanding of the natural and human world.
	Creativity	Creativity considers an individual's interest in innovation.
	Unconventionality	Unconventionality considers an individual's proclivity for appreciating the unusual.
Altruism		Altruism describes an individual's sympathy and gentle-hearted towards others.

personality (Ashton & Lee, 2007; Lee & Ashton, 2018) and its inclusion of an ethical dimension (i.e., Honesty-Humility) has yielded improved predictive ability over other models in domains where such a dimension is also present (e.g., Lee, Gizzarone & Ashton, 2003; Lee, Ashton & Shin, 2005; Marcus, Lee & Ashton, 2007; Bourdage et al., 2012).

Personality, as measured using the HEXACO model, has been associated with ethical motives for meat reduction. For example, environmental intentions and behaviors are not only positively associated with Openness (Markowitz et al., 2012; Soutter et al., 2020), Agreeableness (Milfont, 2021), and Honesty-Humility (Milfont, 2021; Soutter et al., 2020), but environmental attitudes are also a prominent motive of ethical consumerism (Lindeman & Vaananen, 2000). Additionally, work has shown Conscientiousness to be associated with healthy eating intentions (Monds et al., 2016). Moreover, there is evidence that personality traits such as those included in the HEXACO model – Agreeableness, Openness, Extraversion, and Conscientiousness – are predictors of attitudes towards animals and animal experimentation (Furnham et al., 2003; Kovac & Halama, 2022; Zalaf & Egan, 2020). HEXACO has also been used in research on how consumers engaging ethical food consumption are perceived by others; for example, Richetin and Perugini (2022) found organic food consumers were perceived as more honest, agreeable, conscientious, and open. Given the use of HEXACO and similar personality models in predicting these related areas, we expect the HEXACO model to be associated with meat alternative intentions, operationalized as willingness to try, buy, and pay.

1.3. Aims and summary of research questions

We combine literature on ethical behaviours and personality to suggest that HEXACO factors are associated with a novel ethical behaviour – meat alternative willingness to try, buy, and pay. We examined how personality is associated with meat alternative consumption. The research questions proposed in this study are as follows:

(1) Are HEXACO personality factors associated with consumer meat alternative willingness to try, buy, and pay?
(2) Do HEXACO personality facets associate with consumer meat alternative willingness to try, buy, and pay?

Directional relationships between HEXACO personality factors and willingness to try, buy, and pay were pre-registered on AsPredicted.org (https://aspredicted.org/19Q_HLS).

We predicted that Honesty-Humility would have a positive relationship with meat alternative willingness to try, buy, and pay, as pro-environmental attitudes – a related ethical consumption domain – are associated with higher Honesty-Humility (Milfont, 2021; Soutter et al., 2020). As the reduction or elimination of animal meats is often an environmentally motivated behaviour (He et al., 2020), we expected this trait to be similarly associated with willingness to try, buy, and pay.

We predicted that Emotionality would have a negative relationship with meat alternative willingness to try, buy, and pay, as individuals with higher Emotionality experience greater fearfulness and anxiety which could act as a barrier to willingness to try, buy, and pay. Further, core-visceral disgust is a predictor of lower willingness to pay for some meat alternatives (Tuccillo et al., 2020), which we expected would be more salient for those with higher Emotionality.

Furthermore, we predicted Extraversion would not show a relationship with meat alternative willingness to try, buy, and pay, as there have been conflicting findings on Extraversion's influence on other ethical food consumption domains (Bazzani et al., 2017; Gustavsen & Hegnes, 2020).

Next, we predicted Agreeableness would have a positive relationship with meat alternative willingness to try, buy, and pay, for several reasons. First, pro-environmental attitudes have been associated with higher Agreeableness (Milfont, 2021). As the reduction and elimination of animal meats is often an environmentally motivated behaviour (He et al., 2020), we expected this trait to be similarly associated with willingness to try, buy, and pay. Second, there is a positive association between Agreeableness and other ethical food consumption domains, such as organic food consumption (Gustavsen & Hegnes, 2020). Third, Pfeiler and Egloff (2018a) found Agreeableness to be negatively correlated to meat consumption, suggesting Agreeableness may be associated with the desire to eliminate and potentially replace meat in one's diet: meat alternatives seek to serve this role.

We predicted Conscientiousness would have a negative relationship with meat alternative willingness to try, buy, and pay, as other similar ethical consumption domains display this relationship. There also is a negative association between Conscientiousness and organic food consumption (Gustavsen & Hegnes, 2020).

Finally, we predicted Openness to Experience would have a positive relationship with meat alternative willingness to try, buy, and pay, for a few reasons. Primarily, some previous research has found an association between Openness to Experience and the reduction of meat in one's diet (Begue & Treich, 2019). Furthermore, there is a well-established positive correlation between the related area of environmentalism and Openness to Experience (Markowitz et al., 2012; Soutter et al., 2020). Finally, Openness to Experience is positively associated with organic consumption (Gustavsen & Hegnes, 2020) – a similar ethical consumption domain.

2. Method

This study received Institutional Review Board approval prior to data collection.

2.1. Participants and procedure

Participants (n = 500) from the United States, United Kingdom, and Canada were recruited via Prolific Academic to complete the two-part within-person non-experimental correlational study in exchange for monetary compensation at the equivalent of £6 per hour. As

preregistered, the Qualtrics sample size calculator was used to identify a target sample size of 385[1], which was increased to 500 to allow for exclusions and attrition between part 1 and part 2 of the survey. Note a priori power analysis was conducted; however, the final sample size is consistent with recommendations for a "good prediction level" in multiple regression (Knofczynski and Mundfrom, 2007, p. 438).

As was pre-registered, participants were removed for failing at least one attention check and for not completing focal measures. In part 1, seven participants were excluded for failing at least one attention check, resulting in 493 being invited to participate in part 2 one day later. Of these, 478 completed the second survey within the three weeks allotted, and 27 were removed for failing at least one attention check or not completing one or more focal measures in the second survey. The final sample consisted of 451 participants (49.7 % female, M_{Age}=39.06, SD = 13.63), ranging from 18 to 79 years of age (10.3 % of respondents did not indicate an age). More detail about sample age by decade is presented in the Methodological Detail Appendix (MDA; https://osf.io/w3ekp/?view_only=29a72a19dee7449e8115b03ebafd7690).

2.2. Measures

2.2.1. Hexaco personality

We assessed personality using the 100-item HEXACO inventory (Lee & Ashton, 2018) which uses a five-point scale (1 = strongly disagree, 5 = strongly agree) to measure six personality factors with 16 items each, as well as four items for Altruism: Honesty-Humility (α = 0.826, M = 3.47, SD = 0.59, e.g., "I would be tempted to buy stolen property if I were financially tight." [reverse coded]), Emotionality (α = 0.849, M = 3.27, SD = 0.61, e.g., "Whenever I feel worried about something, I want to share my concern with another person."), Extraversion (α = 0.881, M = 3.01, SD = 0.65, e.g., "Most people are more upbeat and dynamic than I generally am." [reverse coded]), Agreeableness (α = 0.849, M = 3.00, SD = 0.56, e.g., "I rarely hold a grudge, even against people who have badly wronged me."), Conscientiousness (α = 0.819, M = 3.56, SD = 0.53, e.g., "I often push myself very hard when trying to achieve a goal."), Openness to Experience (α = 0.832, M = 3.34, SD = 0.62, e.g., "People have often told me that I have a good imagination."); and Altruism (α = 0.613, M = 3.85, SD = 0.64, e.g., "I have sympathy for people who are less fortunate than I am.").

2.2.2. Meat alternative willingness to try, buy, and pay

This variable was used to measure the willingness to try, buy, and pay for the different categories of meat alternatives. After reading an explanation about each type of meat alternative, respondents completed a modified 3-item measure (e.g., "Pay more for pulses"; "Purchase pulses"; "Pay more for pulses") based on de Koning et al.'s (2020) Plant-Based Protein Willingness to Try, Buy, and Pay More scale. Responses were given on a five-point scale (1 = extremely unwilling, 5 = extremely willing; 3 items for each type of alternative) and averaged to create a willingness index wherein a higher value indicates a greater willingness to try, buy and pay for that particular meat alternative. More details on the measure are presented in the MDA. Descriptive statistics are as follows (see also Table 2): Traditional PBMA (α = 0.892, M = 3.25, SD = 1.10); Pulses (α = 0.827, M = 3.63, SD = 0.98), TVP (α = 0.874, M = 3.15, SD = 0.1.12), Insects (α = 0.892, M = 1.85, SD = 1.01), and Cultured Meat (α = 0.893, M = 2.66, SD = 1.16).

2.3. Demographics

Participant age (in years) and gender were collected.

2.4. Attention checks

The first survey (part 1) contained two attention checks: one attention check in the HEXACO-PI-R questions ("Select 1 – Strongly Disagree") and one attention check in its own block ("Please write the fourth word in this sentence exactly as it is written."). The second survey (part 2) contained one attention check. This was identical to the second check from the first survey: in its own block ("Please write the fourth word in this sentence exactly as it is written.").

2.5. Validity checks

A confirmatory factor analysis was conducted in RStudio (with R version 4.1.2) using diagonally weighted least squares (DWLS) as the estimation method for the six HEXACO measurement scales, and suitable fit was obtained: ($\chi2(4449) = 14,846.67$, p <.001, CFI = 0.733, TLI = 0.727, RMSEA = 0.069, 90 % CI[0.067 to 0.070]).

2.6. Statistical analyses

Analysis was done in SPSS version 28. In line with preregistration (https://aspredicted.org/19Q_HLS), we conducted both multiple regression (factor level) and interpreted correlations (facet level) for each dependent variable. Additionally, we provide factor-level intercorrelations for each dependent variable, which was not preregistered.

3. Results

We next focus on interpreting correlations at both the factor and facet level; multiple regression results are reported in the MDA. This was done because multiple regression, particularly at the facet level, can result in suppression effects and other concerns, whereas simple correlations can allow for better interpretability (O'Neill et al., 2014).

3.1. Factor-level correlations

We first computed zero-order correlations between all six HEXACO factors and all 5 dependent variables. These are presented in Table 2; statistically significant results are outlined below; 95 % confidence intervals are presented in parenthesis.

Honesty-humility was significantly and negatively correlated with willingness to try, buy, and pay for cultured meat ($r = -0.12$, p =.009; [−0.213, −0.031]).

Emotionality was significantly and negatively correlated with willingness to try, buy, and pay for insects ($r = -0.12$, p =.008; [−0.214, −0.032]) and significantly positively correlated with willingness to try, buy, and pay for traditional PBMAs ($r = 0.11$, p =.015; [0.250,0.414]).

Extraversion was significantly positively correlated with willingness to try, buy, and pay for insects ($r = 0.11$, p =.025; [0.014,0.196]) and pulses ($r = 0.09$, p =.047; [0.001,0.184]).

Agreeableness was significantly and positively associated with willingness to try, buy, and pay for insects ($r = 0.12$, p =.013; [0.025, 0.207]).

Conscientiousness was significantly and positively associated with willingness to try, buy, and pay for pulses ($r = 0.10$, p =.042; [0.004, 0.187]).

Openness to experience was significantly and positively associated with willingness to try, buy, and pay for cultured meat ($r = 0.16$, p <.001; [0.056, 0.245]), insects, ($r = 0.27$, p <.001; [0.184, 0.355]), textured vegetable protein ($r = 0.22$, p <.001; [0.125, 0.301]), pulses, ($r = 0.30$, p <.001; [0.210, 0.378]), and traditional PBMAs ($r = 0.20$, p <.001; [0.214, 0.382]).

Table 2
Factor-level intercorrelations and descriptive statistics.

	Mean	SD	Alpha		Cultured Meat	Insect	TVP	Pulses	Trad. PBMA	HH	Emotion.	Extrav.	Agree.	Consc.
Cultured Meat	2.66	1.16	0.89											
Insect	1.85	1.01	0.89	Pearson Correlation	0.329**									
				Sig. (2-tailed)	<0.001									
				95 % CI	0.244, 0.409									
TVP	3.15	1.12	0.87	Pearson Correlation	0.412**	0.324**								
				Sig. (2-tailed)	<0.001	<0.001								
				95 % CI	0.333, 0.486	0.239, 0.404								
Pulses	3.63	0.98	0.83	Pearson Correlation	0.164**	0.235**	0.454**							
				Sig. (2-tailed)	<0.001	<0.001	<0.001							
				95 % CI	0.073, 0.253	0.145, 0.320	0.377, 0.524							
Trad. PBMA	3.25	1.1	0.89	Pearson Correlation	0.336**	0.335**	0.695**	0.564**						
				Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001						
				95 % CI	0.251, 0.415	0.250, 0.414	0.644, 0.740	0.498, 0.624						
Honesty-humility	3.47	0.59	0.83	Pearson Correlation	−0.123**	−0.084	−0.017	0.082	−0.021					
				Sig. (2-tailed)	0.009	0.075	0.723	0.081	0.650					
				95 % CI	−0.214, −0.031	−0.175, 0.008	−0.109, 0.076	−0.010, 0.173	−0.114, 0.071					
Emotionality	3.27	0.61	0.85	Pearson Correlation	−0.066	−0.124**	0.076	0.078	0.114*	−0.020				
				Sig. (2-tailed)	0.162	0.008	0.105	0.098	0.015	0.655				
				95 % CI	−0.157, 0.027	−0.214, −0.032	−0.016, 0.168	−0.014, 0.169	0.022, 0.204	−0.107, 0.068				
Extraversion	3.01	0.65	0.88	Pearson Correlation	0.035	0.106*	0.061	0.094*	0.049	−0.011	−0.183**			
				Sig. (2-tailed)	0.455	0.025	0.198	0.047	0.304	0.801	<0.001			
				95 % CI	−0.057, 0.127	0.014, 0.196	−0.032, 0.152	0.001, 0.184	−0.044, 0.140	−0.099, 0.076	−0.266, −0.097			
Agreeableness	3	0.56	0.85	Pearson Correlation	0.036	0.117*	0.029	0.044	0.020	0.266**	−0.232**	0.297**		
				Sig. (2-tailed)	0.444	0.013	0.541	0.350	0.675	<0.001	<0.001	<0.001		
				95 % CI	−0.056, 0.128	0.025, 0.207	−0.064, 0.121	−0.048, 0.136	−0.073, 0.112	0.183, 0.345	−0.313, −0.147	0.215, 0.374		
Consc.	3.56	0.53	0.82	Pearson Correlation	−0.045	−0.090	0.027	0.096*	0.031	0.271**	−0.083	0.269**	0.199**	
				Sig. (2-tailed)	0.342	0.055	0.564	0.042	0.509	<0.001	0.062	<0.001	<0.001	
				95 % CI	−0.137, 0.048	−0.181, 0.002	−0.065, 0.119	0.004, 0.187	−0.061, 0.123	0.188, 0.350	−0.170, 0.004	0.186, 0.348	0.114, 0.282	
Openness	3.34	0.62	0.83	Pearson Correlation	0.156**	0.272**	0.215**	0.296**	0.300**	0.077	0.022	0.063	0.053	0.059
				Sig. (2-tailed)	0.001	<0.001	<0.001	<0.001	<0.001	0.086	0.628	0.156	0.232	0.188
				95 % CI	0.065, 0.245	0.184, 0.355	0.125, 0.301	0.210, 0.378	0.214, 0.382	−0.011, 0.163	−0.066, 0.109	−0.024, 0.150	−0.034, 0.140	−0.029, 0.145

TVP = Textured Vegetable Protein; Trad. PBMA = Traditional Plant-based Meat Alternatives; HH = Honesty-humility; Emotion. = Emotionality; Extrav. = Extraversion; Consc. = Conscientiousness; Openness = Openness to Experience.
**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

3.2. Facet-level correlations

We next conducted facet-level intercorrelations, to explore the relationships between the HEXACO at the facet level, including altruism as an additional facet, and each type of meat alternative. Correlations and confidence interbals are presented in Table 3.

HEXACO facets associated with lower willingness to try, buy, and pay toward cultured meat were Fairness, Modesty, and Fearfulness. HEXACO facets associated with greater willingness to try, buy, and pay were Inquisitiveness, Creativity, and Unconventionality.

HEXACO facets associated with lower insect willingness to try, buy, and pay were Fairness, Fearfulness, Organization, and Perfectionism.

HEXACO facets associated with higher insect willingness were Social Boldness, Forgiveness, Patience, Aesthetic Appreciation, Inquisitiveness, Creativity, and Unconventionality.

Significant correlations between HEXACO facets and TVP willingness to try, buy, and pay were all positive, signalling greater willingness to try, buy, and pay. These facets were Anxiety, Sociability, Aesthetic Appreciation, Inquisitiveness, Creativity, Unconventionality, and Altruism.

Significant correlations between HEXACO facets and pulses willingness to try, buy, and pay were again all positive signalling greater willingness to try, buy, and pay. These facets were Sociability, Diligence, Aesthetic Appreciation, Inquisitiveness, Creativity, Unconventionality,

Table 3
Facet-level bivariate correlations.

	CM	Insects	TVP	Pulses	T. PBMA
	WTBP	WTBP	WTBP	WTBP	WTBP
Honesty-humility					
Sincerity	−0.091	−0.071	−0.020	0.026	−0.061
	[−0.182,0.001]	[−0.163,0.021]	[−0.112,0.073]	[−0.066,0.118]	[−0.153,0.031]
Fairness	−0.116*	−0.121*	−0.046	0.064	−0.027
	[−0.206, −0.024]	[−0.211, −0.029]	[−0.138,0.046]	[−0.029,0.155]	[−0.119,0.066]
Greed Avoidance	−0.029	0.031	0.030	0.091	0.062
	[−0.121−0.063]	[−0.062,0.122]	[−0.063,0.122]	[−0.002,0.181]	[−0.031,0.153]
Modesty	−0.107*	−0.066	−0.004	0.040	−0.043
	[−0.197, −0.014]	[−0.157,. −27]	[−0.096,0.088]	[−0.052,0.132]	[−0.135,0.049]
Emotionality					
Fearfulness	−0.127**	−0.269**	0.002	−0.022	0.014
	[−0.217, −0.035]	[−0.352, −0.181]	[−0.091,0.094]	[−0.114,0.070]	[−0.079,0.106]
Anxiety	0.008	−0.054	0.157**	0.082	0.120*
	[−0.084,0.100]	[−0.146,0.038]	[0.065,0.246]	[−0.010,0.173]	[0.028,0.210]
Dependence	−0.031	−0.027	−0.006	0.059	0.088
	[−0.123,0.062]	[−0.119,0.066]	[−0.098,0.086]	[−0.033,0.151]	[−0.004,0.179]
Sentimentality	−0.021	0.028	0.005	0.060	0.011
	[−0.113,0.071]	[−0.064,0.120]	[−0.087,0.097]	[−0.033,0.151]	[−0.082,0.103]
Extraversion					
Social Self-esteem	0.008	0.035	0.013	0.085	0.033
	[−0.085,0.100]	[−0.057,0.127]	[−0.079,0.105]	[−0.008,0.175]	[−0.060,0.125]
Social Boldness	0.053	0.172**	0.071	0.054	0.074
	[−0.039,0.145]	[0.081,0.260]	[−0.022,0.162]	[−0.039,0.146]	[−0.018,0.166]
Sociability	0.028	0.070	0.096*	0.110*	0.055
	[−0.064,0.120]	[−0.022,0.161]	[0.003,0.186]	[0.018,0.201]	[−0.037,0.147]
Liveliness	0.019	0.049	0.004	0.040	−0.015
	[−0.074,0.111]	[−0.043,0.141]	[−0.089,0.096]	[−0.053,0.131]	[−0.107,0.077]
Agreeableness					
Forgiveness	0.072	0.134**	0.037	0.066	0.057
	[−0.020,0.164]	[0.042,0.223]	[−0.056,0.129]	[−0.027,0.157]	[−0.036,0.148]
Gentleness	−0.001	0.049	0.044	0.016	0.034
	[−0.093,0.091]	[−0.044,0.141]	[−0.048,0.136]	[−0.076,0.109]	[−0.059,0.126]
Flexibility	0.005	0.013	0.025	0.008	−0.032
	[−0.087,0.098]	[−0.079,0.106]	[−0.067,0.117]	[−0.084,0.101]	[−0.124,0.061]
Patience	0.027	0.139**	−0.013	0.038	−0.001
	[−0.066, 0.119]	[0.047,0.228]	[−0.105,0.079]	[−0.054,0.130]	[−0.093,0.092]
Conscientiousness					
Organization	−0.087	−0.110*	−0.015	0.051	−0.029
	[−0.178,0.005]	[−0.200−0.018]	[−0.107,0.078]	[−0.042,0.142]	[−0.121,0.064]
Diligence	0.016	0.009	0.053	0.104*	0.061
	[−0.077,0.108]	[−0.084,0.101]	[−0.039,0.145]	[0.011,0.194]	[−0.031,0.153]
Perfectionism	−0.067	−0.119*	0.036	0.072	0.068
	[−0.158,0.026]	[−0.209, −0.027]	[−0.056,0.128]	[−0.021,0.163]	[−0.024,0.159]
Prudence	0.016	−0.037	0.011	0.056	0.002
	[−0.076,0.108]	[−0.128,0.056]	[−0.081,0.103]	[−0.037,0.147]	[−0.091,0.094]
Openness to Experience					
Aesthetic Appreciation	0.068	0.224**	0.183**	0.310**	0.301**
	[−0.024,0.160]	[0.134,0.310]	[0.092,0.271]	[0.224,0.391]	[0.214,0.382]
Inquisitiveness	0.131**	0.207**	0.155**	0.199**	0.161**
	[0.039,0.220]	[0.117,0.294]	[0.063,0.244]	[0.109,0.287]	[0.070,0.250]
Creativity	0.110*	0.208**	0.126**	0.203**	0.207**
	[0.017,0.200]	[0.118,0.295]	[0.034,0.216]	[0.112,0.290]	[0.116,0.293]
Unconventionality	0.168**	0.163**	0.183**	0.160**	0.229**
	[0.077,0.256]	[0.072,0.252]	[0.092,0.271]	[0.069,0.248]	[0.140,0.315]
Altruism	−0.067	0.027	0.120*	0.199**	0.188**
	[−0.159,0.025]	[−0.066,0.119]	[0.28,0.210]	[0.109,0.286]	[0.097,0.275]

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed). CM = Cultured Meat; T. PBMA = Traditional PBMA.

and Altruism.

Finally, significant correlations between HEXACO facets and traditional PBMA willingness to try, buy, and pay were all positive signalling greater willingness to try, buy, and pay. These facets were Anxiety, Aesthetic Appreciation, Inquisitiveness, Creativity, Unconventionality, and Altruism.

4. Discussion

We linked extant literature on personality's role in diet-related behavior (Begue & Treich, 2019; Monds et al., 2016) and ethical beliefs (e.g., environmental [Hirsh & Dolderman, 2007; Markowitz et al., 2012; Milfont, 2021], animal welfare [Furnham et al., 2003; Kovac & Halama, 2022; Zalaf & Egan, 2020]) with the core motives underlying the creation and consumption of meat alternatives (He et al., 2020) to propose that personality would be associated with willingness to try, buy, and pay for several different meat alternatives. We found personality is associated with meat alternative willingness to try, buy, and pay, and, importantly, that the particular personality factors and facets relevant to each meat alternative category are unique.

Across all the meat alternatives considered, Openness was the only factor found to be associated with all types of meat alternatives. More specifically, we find that the Openness facets of Inquisitiveness and Unconventionality are positively associated with willingness to try, buy, and pay across all alternatives. Overall, a greater tendency to embrace and pursue novelty was associated with more willingness to try, buy, and pay for all meat alternative categories. This corresponds with our directional prediction and aligns with prior literature: Openness is found to predict willingness to eat less meat (Begue & Treich, 2019).

Beyond Openness, and based on our findings, our predictions were partially supported. For example, we predicted Honesty-Humility would have a positive relationship with meat alternative willingness to try, buy, and pay; however, we found a significant negative relationship between Honesty-Humility and willingness to try, buy, and pay for cultured meat and insects, and non-significant relationships for TVP products, traditional PBMA, and pulses. Accordingly, our directional prediction was only supported for pulses. While we construed meat alternative consumption overall as more ethical than meat consumption, consistent with prior work (Spagnuolo, 2021), respondents were considering different types of meat alternatives in parallel. It is perhaps the case, then, that insects – recognizable in the mind's eye as a living being – and cultured meat – the ethicality of which may be ambiguous in comparison with other meat alterative types. As such, these forms may be different in terms of novelty, entitavity, or both. This remains an interesting area for further exploration, wherein positioning through marketing efforts may be able to shape such perceptions.

Moving to Emotionality, we predicted it would have a positive relationship with meat alternative willingness to try, buy, and pay, and this was a supported directional prediction in the case of 3 meat alternative categories: TVP products, pulses, and traditional PBMA. Despite this, we found a significant negative relationship between Emotionality and willingness to try, buy, and pay for insects and a non-significant negative relationship for cultured meat. Emotionality includes facets such as Fearfulness and Anxiety, which could certainly shape responses to particularly novel meat alternatives like insects or (to a lesser degree) cultured meat. Facet-level results suggest that Fearfulness in particular is driving these two relationships.

Furthermore, we predicted Extraversion would have no clear relationship with meat alternative willingness to try, buy, and pay, and while we found no significant relationship at the factor level, there were non-significant positive relationships across all meat alternative categories. Overall, a lack of clear linkage between Extraversion and meat alternative willingness to try, buy, and pay was substantiated by our findings.

Looking at Agreeableness, we predicted there would be a positive relationship with meat alternative willingness to try, buy, and pay. We

did find directional, positive relationships across all meat alternative categories at the factor level; however, this relationship was only significant for insects. Facet-level data indicates that Forgiveness and Patience facets are driving this effect for insects, but no clear rationale for this effect is evident.

Finally, we predicted Conscientiousness would have a negative relationship with meat alternative willingness to try, buy, and pay; however, we found a significant negative relationship for insects, a non-significant negative relationship for cultured meat, and non-significant positive relationships for TVP products, pulses, and traditional PBMA. From these results, our directional prediction was only supported for cultured meat and insects. As with other HEXACO factors, more novel forms of meat alternative (i.e., insects and cultured meat) differentiated themselves from more traditional forms.

One interesting note is that while the strength of these relationships differs uniquely across each category, personality factor, and personality facet, there are some categories of meat alternatives which share directional relationships. First, across all personality factors, cultured meat and insects share directional results. Similarly, TVP products and traditional PBMA share directional results at the factor level. While it cannot be said that these categories match when it comes to the detail of facets, these aforementioned groupings could be used at the factor level. Future research should consider these groupings for similarities and consumer perceptions, which could motivate behaviours.

The factor and facet correlations, respectively, provide greater insights into willingness to try, buy, and pay for each alternative and suggest that meat alternatives cannot be considered as a single product category, as each has unique attributes that appeal to different personality components. Existing literature has demonstrated associations between ethical motives and other individual differences and meat alternative willingness; we add to this literature by demonstrating how personality is associated therein. Important future directions include examining whether and how personality may be associated with willingness to try, buy, and pay over and above these other individual differences and/or whether personality may be associated with willingness to try, buy, and pay through other individual differences (e.g., ethical concerns, bravery).

4.1. Theoretical implications

The insights gained from this study have theoretical implications and are valuable to future research. Our work extends the understanding of ethical food consumption and personality beyond organic consumption. Moreover, meat alternatives research within consumer behavior is a relatively new and emerging topic (e.g., de Koning et al., 2020; Estell et al., 2021; Hartmann et al., 2018; He et al., 2020; Hinrichs et al., 2022; Hwang et al., 2020; Michel et al., 2021; Onwezen et al., 2021), and our work advances it by demonstrating comprehensive relationships between personality factors and five unique categories of meat alternatives to set the foundation for future research. Notably, we do so using a population unencumbered by food restrictions (i.e., the substantial majority of consumers; Bourassa, 2021). One potential avenue for future research is to examine the facets correlated with each alternative category to determine the precise role they play; for example, given the Fairness facet is correlated with willingness to try, buy, and pay toward cultured meat, one could examine if similar variables are predictive of cultured meat consumption – such as just-world belief or sense of justice. Another direction for future work is examining whether personality is a distal indicator of meat alternative willingness, with associations operating through already examined individual differences, such as familiarity (Onwezen et al., 2021). Now that we have established the associations reported here, future work can examine this potential pattern to more fully understand how personality influences meat alternative willingness.

4.2. Practical implications

The findings are applicable to wider audiences: governmental, non-profit, and managerial. The greater understanding of who is more likely to intend to consume meat alternatives allows governmental and non-profit stakeholders to promote this type of ethical consumption more successfully; this is particularly relevant as governments across the globe seek to reduce their countries' environmental impact. Moreover, insights on the positive and negative associations with meat alternative willingness to try, buy, and pay provided in this study are valuable to managers and marketers of meat alternative products. Specific insights unique to each alternative category as presented are potential strategic avenues to promote and target consumer engagement.

4.3. Strengths and limitations

This work has several notable strengths. First, the use of the HEXACO personality inventory is a strength, as it is a comprehensive and reliable measurement of personality. Additionally, we temporally separated predictor from criterion measurement, as a means of attenuating common method bias (Podsakoff et al., 2003). Despite these strengths, there are also notable limitations. First, while prevalent in the literature, online sampling has potential concerns for data quality (e.g., Aguinis et al., 2020; Smith et al., 2016). Second, we examine meat alternative willingness in several items, but it is important to note this is a measure of intentions and cannot be equivocated with behavior. Future research should examine whether the same findings hold true for actual consumption behaviors, in addition to the intentions we investigated. Additionally, Pfeiler and Egloff (2018b) note that diet-related choices and personality may have smaller effect sizes compared to other domains, requiring substantially larger sample sizes to demonstrate findings. This may act as a limitation of this study, and it is possible that a sample size of greater than 500 would provide greater insights. Accordingly, future research might re-examine our research questions in the context of a larger sample size to determine if some theorized effects were simply too small to observe herein.

4.4. Conclusions

Ethical consumption is a rapidly growing interest in the marketplace and academic communities alike, as it serves as a potential means to address several ethical concerns. Meat alternative consumption is one of these. We find personality factors and facets are uniquely associated with meat alternative willingness to try, buy, and pay across and between five categories, with Openness being the only factor to significantly correlate across all categories. The insights from this work are beneficial to a range of stakeholders and lay the foundation for significant future research.

CRediT authorship contribution statement

Zandria Bates: Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing. **Rhiannon M. Mesler:** Conceptualization, Methodology, Formal analysis, Writing – review & editing, Supervision, Funding acquisition. **Jennifer Chernishenko:** Conceptualization, Validation, Formal analysis, Writing – original draft, Writing – review & editing, Supervision. **Cara MacInnis:** Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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